

Appl. No. 10/709,550
 Amdt. dated January 23, 2006
 Reply to Office action of November 01, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

- 1 (currently amended): A method for detecting early fires in a
 5 predetermined area, the method comprising:
 (a) capturing a plurality of images of the predetermined area during
 an interval for generating a plurality of difference frames;
 (b) detecting a number of pixels that have fire characteristics in each difference
 frame by determining if each pixel of each difference frame satisfies the
 10 relationship $R > R_t$, where R is a value of a red component of the pixel
 and R_t is a threshold of the red component; and
 (c) if the result of step (b) indicates that a flame in the predetermined area
 substantially increases during the interval, outputting an early fire alarm.
- 15 2 (currently amended): The method of claim 1 wherein determining the
 number of pixels that have fire characteristics in each difference
 frame further comprises step (b) includes: determining if each pixel
 of each difference frame complies with the following rules satisfies
 the relationship $R \geq G > B$, where G is a value of a green component of
 20 the pixel and B is a value of a blue component of the pixel, +
 $R > R_t$;
 $R \geq G > B$; and
 $S \geq ((255 - R) * S_t / R_t)$;
 ~~wherein R is a value of a red component of the pixel, R_t is a~~
 25 ~~threshold of the red component, G is a value of a green~~
 ~~component of the pixel, B is a value of a blue component of the~~
 ~~pixel, S is saturation of the pixel, S_t is a threshold of saturation;~~

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and

~~if a pixel complies with the above rules, adjusting the number of
pixels that have fire characteristics of the difference frame.~~

5 3 (cancelled).

4 (original): The method of claim 1 wherein in step (c), if the result of step (b) indicates
that a ratio of spreading flame in the predetermined area is over a threshold of
spreading flame during the interval, then outputting the early fire alarm.

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5 (currently amended): The method of claim 1 wherein step (a) including
includes:

comparing two images captured for generating a difference of the
two images; and

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removing noise from the difference for generating a difference
frame.

6 (currently amended): A method for detecting a number of pixels that have
fire characteristics in a difference frame, the method comprising:

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determining if each pixel of the difference frame complies with the
following rules:

$R > R_t$;

$R \geq G > B$; and

$S \geq ((255-R)*St/R_t)$;

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wherein R is a value of a red component of the pixel, R_t is a
threshold of the red component, G is a value of a green
component of the pixel, B is a value of a blue component of the
pixel, S is saturation of the pixel, and St is a threshold of

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saturation; and

if a pixel complies with the above rules, adjusting the number of pixels that have fire characteristics of the difference frame.

5 7 (original): The method of claim 6 wherein when the value of the red component of a pixel is R_t , the saturation of the pixel is S_t .

8 (original): The method of claim 6 wherein a video detecting system captures images in a predetermined area and the difference frame is
10 generated by removing noise of a difference of two images captured by the video detecting system.

9 (currently amended): A video detecting system comprising:
an image capturing device for capturing images;
15 a logic unit for performing the following steps:
(a) controlling the image capturing device to capture a plurality of images of a predetermined area during an interval for generating a plurality of difference frames;
(b) detecting a number of pixels that have fire characteristics in
20 each difference frame by determining if each pixel of each difference frame satisfies the relationship $R > R_t$, where R is a value of a red component of the pixel and R_t is a threshold of the red component; and
(c) if the result of step (b) indicates that a flame in the
25 predetermined area substantially increases during the interval, outputting an early fire alarm.

10 (currently amended): The video detecting system of claim 9 wherein

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determining the number of pixels that have fire characteristics in each difference frame further comprises ~~step (b) performed by the logic unit includes:~~ determining if each pixel of the difference frame satisfies the relationship $R \geq G > B$, where G is a value of a green component of the pixel and B is a value of a blue component of the pixel. ~~complies with the following rules:~~

$$R > R_t;$$
$$R \geq G > B; \text{ and}$$
$$S \geq ((255 - R) * S_t / R_t);$$

wherein ~~R is a value of a red component of the pixel, R_t is a threshold of the red component, G is a value of a green component of the pixel, B is a value of a blue component of the pixel, S is saturation of the pixel, S_t is a threshold of saturation; and~~

~~if a pixel complies with the above rules, adjusting the number of pixels that have fire characteristics of the difference frame.~~

11 (cancelled).

12 (original): The video detecting system of claim 9 wherein if the result of step (b) indicates that a ratio of spreading flame in the predetermined area is over a threshold of spreading flame during the interval, the logic unit outputs the early fire alarm.

13 (original): The video detecting system of claim 9 wherein step (a) performed by the logic unit includes:
comparing two images captured for generating a difference of the

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two images; and
removing noise from the difference for generating a difference
frame.

5 14 (cancelled).

15 (original): The video detecting system of claim 9 wherein the logic unit
is a program code.

10 16 (currently amended): A video detecting system comprising:

an image capturing device for capturing images;

a logic unit for performing the following steps:

(a) determining if pixels of difference frames complies with the
following rules, the difference frames generated from images
15 captured by the video detecting system:

$R > R_t$;

$R \geq G > B$; and

$S \geq ((255-R)*S_t/R_t)$;

20 wherein R is a value of a red component of the pixel, R_t is a
threshold of the red component, G is a value of a green component
of the pixel, B is a value of a blue component of the pixel, S is
saturation of the pixel, and S_t is a threshold of saturation; and

(b) if a pixel complies with the above rules, adjusting a number of
pixels that have fire characteristics of the difference frame.

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17 (original): The video detecting system of claim 16 wherein when the
value of the red component of a pixel is R_t , the saturation of the pixel
is S_t .

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18 (original): The video detecting system of claim 16 wherein step (a)
performed by the logic unit includes:

5 comparing two images captured for generating a difference of the
 two images; and
 removing noise from the difference for generating a difference
 frame.

19 (cancelled).

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20 (original): The video detecting system of claim 16 wherein the logic
unit is a program code.

15 21 (new): The method of claim 2 wherein determining the number of pixels
 that have fire characteristics in each difference frame further
 comprises determining if each pixel of each difference frame
 satisfies the relationship $S \geq ((255-R)*St/Rt)$, wherein S is saturation
 of the pixel and St is a threshold of saturation.

20 22 (new): The method of claim 21 wherein when the value of the red
 component of a pixel is Rt, the saturation of the pixel is St.

25 23 (new): The video detecting system of claim 10 wherein determining the
 number of pixels that have fire characteristics in each difference frame
 further comprises determining if each pixel of each difference frame
 satisfies the relationship $S \geq ((255-R)*St/Rt)$, wherein S is saturation
 of the pixel and St is a threshold of saturation.

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24 (new): The video detecting system of claim 23 wherein when the value of the red component of a pixel is R_t , the saturation of the pixel is S_t .